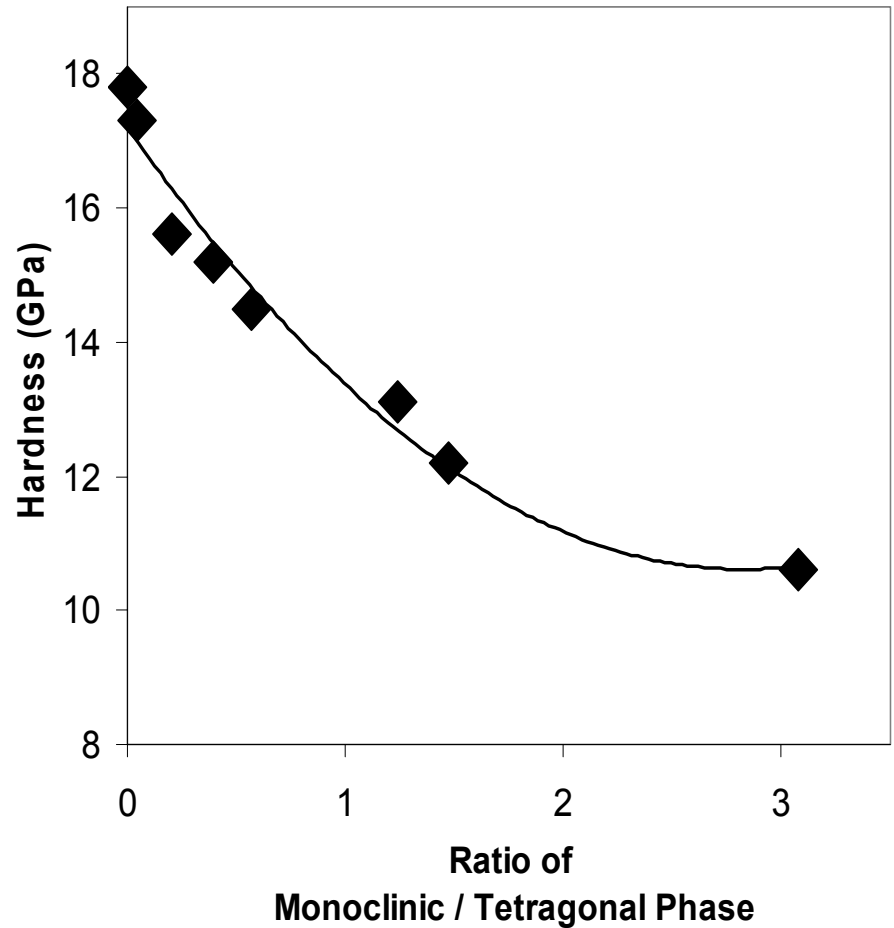


Materials Science of Explanted Ceramic Hip Implants

Yogesh Vohra, University of Alabama at Birmingham, DMR-9987872

Implants removed from human body after a certain period of clinical use are termed “explanted”. This allows materials scientists to study the effects of the body environment and physiological cyclic loading on the structural and mechanical properties of biomaterials. Mechanical wear is one of the leading causes of failure of hip implants. The present study is focused on the tetragonal to monoclinic surface transformation in explanted zirconia hip implants. The amount of surface monoclinic phase increases with the duration of implant in the human body. The surface hardness decreases making implant less wear resistance with time.

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The surface hardness of zirconia hip implant decreases over time due to increasing transformation of tetragonal phase in to a monoclinic phase.

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Education: Monique Cook is one of the eleven undergraduate students selected for the NSF-funded REU-site program at UAB campus. REU-students participate in short-term research projects that can result in peer-reviewed publications. Monique Cook spent her summer studying surface properties of many explanted hip implants. Her diligence in the research project and keen observation led to this interesting trend in surface hardness of zirconia hip implants.



Undergraduate physics major Monique Cook studying an explanted Zirconia hip implant by a Thin Film X-ray Diffraction technique to investigate surface transformation and its impact on the mechanical properties.